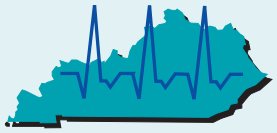


EQC

Environmental Quality Commission
Environmental Indicators Program
Reporting on Environmental Trends and Conditions in Kentucky.

1996 Trends Reports
- Safe Drinking Water
- Air Quality
- Waste Management
- Toxics
- Water Quality
- Natural Resources
- Resource Extraction

EQC is a seven member citizen commission created under state law with a mission to monitor environmental trends and conditions, promote partnerships to improve and protect the environment, provide a public forum for the discussion of environmental issues, and advise state officials on environmental matters.

Waste Management

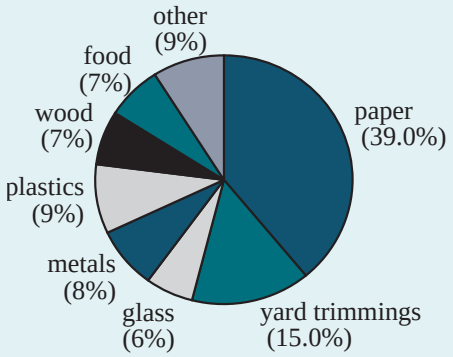
Managing Kentucky's waste has long been a challenge. But during the past decade, the state has met this challenge head on and passed numerous laws and regulations to further promote the proper disposal of waste. Today, Kentucky has 24 state-of-the-art municipal solid waste landfills. More Kentuckians are participating in garbage collection and recycling programs. The number of hazardous waste sites cleaned up now number more than 500. And renewed efforts to target illegal dumping attest to the state's continued commitment to tackling the tough waste issues confronting Kentucky.

Yet with all these efforts, improper disposal of solid and hazardous wastes still threatens our environment. This *State of Kentucky's Environment* trends report will measure the state's progress in properly managing its waste. Included in this indicator report is a review of solid waste generation, disposal, and recycling trends; hazardous waste generation and reduction activities; and the clean up of contaminated waste sites and leaking underground storage tanks.

Solid Waste

Kentuckians continue to produce more garbage than ever before. The average person now generates 4.4 pounds of garbage a day.[1] In Kentucky, this amounts to an estimated 17 million pounds of garbage daily. Most of the solid waste produced is paper, comprising 39% of the waste stream, followed by yard waste at 15% **(Figure 1)**. The typical person discards about 3.4 pounds of waste each day (after recycling and composting), according to the U.S. Environmental Protection Agency (U.S. EPA).[2]

Figure 1 Composition of the Municipal Solid Waste Stream



Note: By weight, 1994 nationwide average.
Source: U.S. EPA

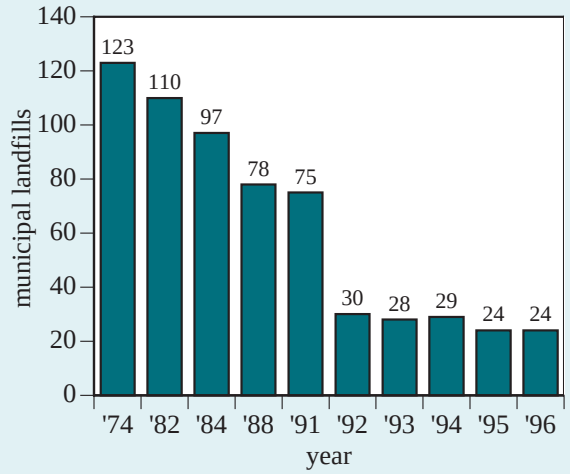
Solid Waste Landfills in KY
Decline 68% Since 1992, 24 State-of-the-Art Landfills Permitted

About 61% of the nation's solid waste is disposed of in landfills.[3] But now there are fewer, but larger landfills in which to dispose of waste with the closing of many due to stringent construction and operating standards which took effect in 1993, pursuant to Subtitle D of the federal Resource Conservation and Recovery Act. Nationwide, the number of solid waste landfills fell from 5,345 in 1992 to 3,581 in 1995.[4]

In Kentucky, solid waste laws and regulations passed in 1990 and 1991 resulted in the closure of more than half of the 75 municipal solid waste landfills by 1992 **(Figure 2)**. Since then, six more facilities have closed, leaving 24 state-of-the-art municipal solid waste (MSW) landfills **(Figure 3)**. These landfills must meet stringent standards including plastic and clay composite liners (20 landfills) or double composite liners (4 landfills), leachate recovery, and the use of comprehensive systems to monitor groundwater for up to 75 different parameters.

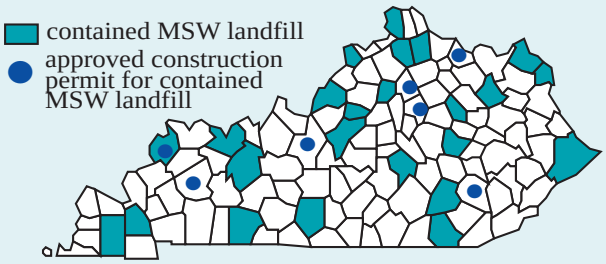
In Kentucky, solid waste laws and regulations passed in 1990 and 1991 resulted in the closure of more than half of the 75 municipal solid waste landfills by 1992. Since then, six more facilities have closed, leaving Kentucky with 24 state-of-the-art municipal solid waste (MSW) landfills.

Figure 2 Number of Municipal Solid Waste Landfills in Kentucky



Note: Contained permitted MSW landfills.
Source: KY Division of Waste Management

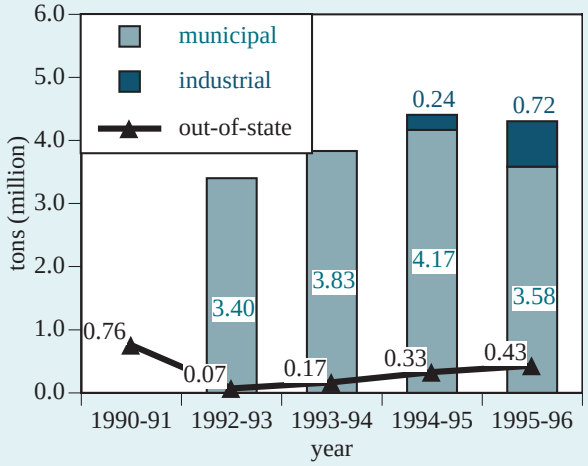
Figure 3 Location of Contained Municipal Solid Waste Landfills in KY



Note: Contained MSW landfills as of September 15, 1996.
Source: KY Division of Waste Management

Municipal solid waste disposed at landfills fell 14% during the past year, due likely to the diversion of waste to other facilities such as construction and demolition landfills and the recovery of materials for recycling. During fiscal year 1995-96, out-of-state garbage accounted for 10% of the total waste disposed at MSW landfills. About 97% of the out-of-state garbage came from neighboring states.

Figure 4 Disposal of Solid Waste at Municipal Solid Waste Landfills in KY



Note: Fiscal year (July-June). Totals rounded. 1990-91 data not available for total waste disposed.
Source: KY Division of Waste Management

4.3 Million Tons of Waste Disposed at Landfills in 1995-96

The amount of garbage disposed at MSW landfills has increased in the past few years as more Kentuckians participate in garbage collection programs **(Figure 4)**. However, Figure 4 also shows that waste disposed at the 24 contained MSW landfills fell 14% during the past year, due likely to the diversion of waste to other facilities such as construction/demolition landfills and the recovery of materials for recycling.

Out-of-state garbage disposed at MSW landfills has steadily increased from 2% of the total in 1992-93 (70,000 tons) to 10% of the total in 1995-96 (429,938 tons) **(Figure 4)**. About 97% of the out-of-state garbage came from neighboring states with the remainder shipped from NJ, NY, PA, SC, LA, MD, MI, MS, OK, AL, and AR in FY 95-96. Landfills in Kentucky accepting waste from noncontiguous states in FY 95-96 were Bavarian, Boone Co.; Waste Management, Jefferson Co.; LWD, Marshall Co.; and the Ohio Co. Balefill. Kentucky exported 228,968 tons of solid waste to other states for disposal in 1995, according to county solid waste reports.

The export of garbage to other states for disposal has led Congress to consider legislation to restrict garbage shipments. The proposed Interstate Waste Act would give local governments authority to control waste coming into their jurisdiction. The mea-

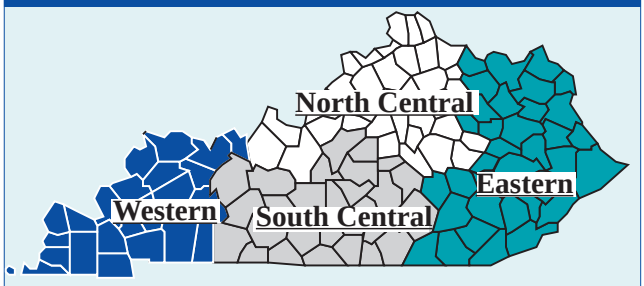
sure is currently being debated by Congress with heavy opposition from waste exporting states.

25.3 Years of Statewide Landfill Capacity Permitted

Kentucky has 25.3 years of statewide permitted landfill capacity, compared to less than five years of capacity just four years ago. State statutes, as revised by Senate Bill 2 in 1991, gave local governments the ability to determine whether they want to site a landfill and its ultimate size (capacity). As such, landfill capacity varies by region **(Figure 5)**. Construction permits have been approved for another 7 landfills in the state which will provide even additional capacity.

In Aug. 1994, Eastern KY Resources (EKR), a Florida-based partnership, challenged the constitutionality of Senate Bill 2. EKR had submitted an application to the state in Jan. 1991 to site a 10,000 ton-per-day landfill in Magoffin County. The application was not processed because of a lawsuit involving a contract between EKR and the Magoffin County Fiscal Court and a local decision not to host the landfill. EKR, in its case, claimed that the authority granted to counties to host a landfill interferes with the Interstate Commerce Clause of the U.S. Constitution. The U.S. District Court upheld the constitutionality of Senate Bill 2 in Sept. 1995. EKR has appealed this decision to the Sixth Court of Appeals. A ruling is anticipated in 1997.

Figure 5 Permitted Municipal Solid Waste Landfill Capacity By Region (1996)



County	Landfill	Remaining Capacity (cubic yards)
North Central		
Boone	Bavarian	2,883,935
Estill	Waste Management	7,154,242
Franklin	BFI	3,566,653
Grant	Epperson	11,193,697
Pendleton	Rumpke	4,633,365
Trimble	Laidlaw	7,292,015
Jefferson	Waste Management	28,450,000
Spencer	Williams Sanitation	2,055,031
Total remaining capacity		**67,228,938 or 14.6 years***
Eastern		
Montgomery	Rumpke	3,401,559
Laurel	Laurel Ridge	9,570,865
Whitley	Tri-County	3,175,287
Pike	Pike Co. Fiscal Court	612,287
Boyd	Cooksey Brothers	1,303,243
Greenup	Green Valley	2,655,630
Rowan	Local Sanitation	12,723,089
Total remaining capacity		**33,441,960 or 33.8 years***
Western		
Daviess	Daviess Co. Fiscal Ct.	5,348,653
Graves	Jones Sanitation	869,384
Marshall	LWD	2,630,000
Union	Dozit	6,272,775
Total remaining capacity		**15,120,812 or 23 years***
South Central		
Barren	City of Glasgow	664,995
Lincoln	Tri-K Landfill	6,653,459
Logan	Southern Sanitation	7,444,065
Nelson	Nelson County Landfill	2,474,561
Ohio	Ohio County Balefill	20,711,997
Total remaining capacity		**37,949,077 or 56.7 years***

*Note: As of 4/30/96. *Regional capacity needs based on waste reported disposed by county as reported in 1995 County Solid Waste reports. Source: KY Div. of Waste Management*

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Monitoring at Old Landfills Detect Groundwater Contamination

Closure permits were issued to 56 landfills in the spring of 1996, and 14 have already detected groundwater contamination. Contaminants detected at some of the old landfills include benzene, vinyl chloride, lead, and various heavy metals and toxic chemicals.

The 24 MSW landfills now operating must meet strict closure requirements which include monitoring for a 30-year period. Rather than meet the new monitoring and closure requirements, 56 MSW landfills closed by 1992. Under the 1990 state rules, these landfills are required to monitor groundwater for a two-year period and install a leachate system if an outbreak occurs to collect and treat water discharged from the site. The Division of Waste Management has recommended that closed landfills have a groundwater monitoring system in place and also construct a 36-inch soil cap over the disposal area by Nov. 15, 1996 **(Figure 6)**.

The 56 landfills that closed under the 1990 state rules are now in the process of meeting the closure requirements. Closure permits were issued to the 56 landfills in the spring of 1996, and 14 have already detected groundwater contamination. Contaminants detected at some of the old landfills include benzene, vinyl chloride, lead, and various heavy metals and toxic chemicals.

Sites where groundwater contamination is detected are required to conduct an assessment to determine if contamination has advanced beyond the borders of the site. As of August 1, 1996, 14 closed landfills with confirmed groundwater contamination were conducting assessments **(Figure 6)**. Once a groundwater assessment is complete, a report is prepared to further detail contamination problems. A corrective action plan is then prepared to address the contamination. Two of the 56 landfills — McCracken County Fiscal Court and Pulaski Grading — have submitted corrective action plans and are conducting remediation activities. Groundwater contamination has also been detected at old disposal cells at existing MSW landfills and several sites are in assessment including Bavarian (Boone Co.), Local Sanitation (Rowan Co.), Waste Management (Jefferson Co.), Rumpke (Pendleton & Montgomery Co.), Southern Sanitation (Logan Co.), and Cooksey (Boyd Co.).

Financial Assurance Bonds Increased to Cover Closure Costs

Financial assurance bonds for the 24 contained MSW landfills operating in Kentucky have been increased to better cover closure costs. It costs on average $90,000 to $100,000 per acre to close a landfill. Current MSW landfill bonds now range from $3.3 million (Pike County Landfill) to $37 million (Outer Loop Landfill in Jefferson County).

Many old landfills are today's contaminated waste sites. One of the recently closed landfills, Roe Creek in Lawrence County, was declared a state superfund site in 1995, after the owners declared bankruptcy and bags of asbestos illegally disposed at the site were found washing into a creek. State officials have spent $117,000 to contain the Roe Creek nine-acre landfill during 1996 using state funds and the forfeiture of the landfill's $35,000 bond. The state has since assessed a fine against the landfill for $4.6 million. Landfill owners are required to secure bonds in the event the owner or operator fails to close a site properly. Financial assurance bonds for the 24 contained MSW landfills have been increased to better cover closure costs and are based on size and other factors. It costs, on average, $90,000 to $100,000 per acre to close a landfill. Current MSW landfill bonds now range from $3.3 million (Pike Co. Landfill) to $37 million (Waste Management in Jefferson Co.).

Landfill Construction and Operating Costs Lead to Higher Tipping Fees

Complying with the federal solid waste requirements has led to higher landfill tipping fees throughout the nation. National average solid waste landfill tipping fees have increased almost 400% since 1985. **Figure 7** shows that the average tipping fees in Southern states, including Kentucky, are slightly below the national average.[5] The Northeast has the highest tipping fees in the nation.

Average landfill tipping fees in Kentucky increased 27% between 1993 and 1995 **(Figure 8)**. According to the National Solid Waste Management Association, tipping fees can be expected to rise, on average, about seven percent a year. A June 1996 survey of tipping fees at the 24 MSW landfills found rates ranged from $19.52 a ton at the Local Sanitation Landfill in Rowan County to $35 a ton at Williams Sanitation Landfill in Spencer County.[6]

Figure 6 Status of Closed Residential Landfills in Kentucky (as of 8/1/96)

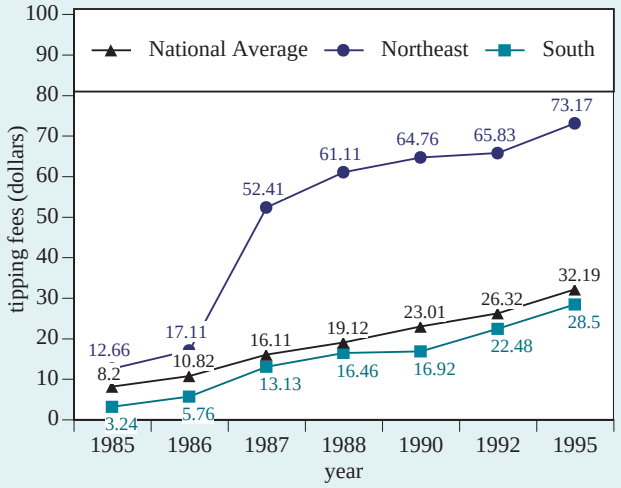
Landfill	County	GW Monitoring	Cap	Leachate System
Scottsville/Allen County	Allen	yes	no	no
Bullitt County Landfill	Bullitt	yes*	no	no
City of Bowling Green	Butler	yes	no	no
Crider and Rogers	Caldwell	yes	yes	no
City of Murray	Calloway	yes*	no	no
City of Hopkinsville	Christian	yes*	no	no
Winchester Mun. Utilities	Clark	yes	no	yes
Ferrill and Stockton	Cumberland	yes**	partial	no
Daviess County Fiscal Court East	Daviess	yes	no	no
City of Owensboro	Daviess	yes	no	no
Lexington/Fayette Co.	Fayette	yes*	yes	yes
Raymond Carpenter	Fleming	yes	no	yes
Floyd County Fiscal Court	Floyd	yes	partial	yes
B & J Sanitation	Fulton	yes	no	no
City of Leitchfield	Grayson	yes	no	no
Hilltop Landfill	Greenup	no	no	no
Hancock County Fiscal Court	Hancock	yes	yes	yes
Hardin County Fiscal Court	Hardin	yes*	no	no
Fort Knox/U.S. Army	Hardin	yes*	yes	no
City of Cynthiana	Harrison	yes	yes	no
Orville Nunn	Hart	no	no	no
City of Henderson	Henderson	yes	no	no
City of Dawson Springs	Hopkins	yes	no	no
Hopkins County Fiscal Court	Hopkins	yes	no	no
Jackson County Fiscal Court	Jackson	yes**	partial	yes
Valley Sanitation Landfill	Jefferson	no	no	no
Kramers Lane Landfill	Jefferson	yes*	yes	no
City of Barbourville	Knox	no	no	partial
E.R. Hooper Landfill	Laurel	yes	partial	yes
Roe Creek Development	Lawrence	yes***	no	yes
Letcher County Fiscal Court	Letcher	no	no	no
McCracken Fiscal Court	McCracken	yes****	no	yes
Paducah Gaseous Diffusion	McCracken	yes*	yes	no
McLean County Fiscal Court	McLean	no	no	no
Berea Sanitation Department	Madison	no	partial	yes
City of Richmond	Madison	no	no	no
Magoffin County Fiscal Court	Magoffin	yes	no	no
City of Lebanon	Marion	yes*	no	no
Marshall County Fiscal Court	Marshall	yes*	no	no
Mason County Fiscal Court	Mason	yes*	partial	yes
Otter Creek Park	Meade	no	yes	no
Mercer County Fiscal Court	Mercer	yes	partial	partial
Foothills Development	Montgomery	yes	partial	yes
Muhlenberg County Landfill	Muhlenberg	no	no	no
Ohio Co. Fiscal Court	Ohio	yes*	yes	no
Perry County Fiscal Court	Perry	no	no	no
Pulaski Grading Landfill	Pulaski	yes****	no	yes
City of Georgetown	Scott	yes*	yes	yes
Solid Waste Comm. (Waddy)	Shelby	yes	no	no
Solid Waste Comm. (Shelbyville)	Shelby	yes	no	no
City of Campbellsville	Taylor	no	no	yes
Trigg County Fiscal Court	Trigg	no	no	no
Earle C. Clements Job Corps	Union	yes	no	no
City of Springfield*	Washington	yes*	yes	no
Donald R. Carrender	Wayne	yes	yes	no
Webster County Landfill	Webster	no	no	no

The 56 MSW landfills that closed prior to 1992, under the 1990 rules, are required to monitor groundwater for a two-year period and install a leachate system if an outbreak occurs to collect and treat water discharged from the site. The closed landfills are required to have a groundwater monitoring system in place and also construct a 36-inch soil cap over the disposal area by Nov. 15, 1996.

**Groundwater contamination confirmed; in assessment. Contaminants detected at some of the old landfills include benzene, vinyl chloride, lead, and various heavy metals and toxic chemicals. **Wells installed, not monitoring. ***State superfund site. ****Groundwater contamination confirmed; in corrective action. Source: KY Division of Waste Management*

National average tipping fees at solid waste landfills have increased almost 400% since 1985. The average tipping fees in Southern states, including Kentucky, are slightly below the national average.[5]

Figure 7 Average MSW Landfill Tipping Fees



Source: National Solid Waste Management Association

Average landfill tipping fees in Kentucky have increased 27% between 1993 and 1995.

Figure 8 Average MSW Landfill Tipping Fees in KY

Year	Tipping Fee
1993	$21.69
1994	$23.49
1995	$24.43
1996	$27.49

Source: National Solid Waste Management Assn.

Construction/ Demolition Landfills Double Since 1994

There are other facilities that process or dispose of waste in Kentucky **(Figure 9 & 10)**. These include:

- Residual landfills - which are typically operated by an industry to dispose waste by-products from the manufacturing process.
- CDD landfills - construction/demolition debris landfills which receive inert waste.
- Transfer stations - facilities where shipments of waste are held or transferred.
- Landfarms - operations that land apply solid waste, biosolids (wastewater treatment sludge that has met minimum treatment standards) or special waste.
- Special waste landfills - high-volume, low hazard waste that includes mining waste, electric-generating utility ash, sludge, cement kiln ash, oil and gas drilling muds, and oil production brines.

The construction, operation, and closure requirements for these facilities vary according to the risks posed to the environment. For example, construction/demolition debris (CDDs) landfills are exempt from groundwater monitoring requirements if they are less than one acre in size. Of the 132 CDD landfills currently with permits to operate in Kentucky, 111 are less than one acre.

The number of CDDs in Kentucky has more than doubled since 1994. CDDs offer municipalities a low-cost disposal alternative for certain types of inert waste. The average cost to dispose waste at a CDD landfill is $7 to $10 a ton compared to $27 at a MSW landfill. Many small CDDs are operated by developers for disposal

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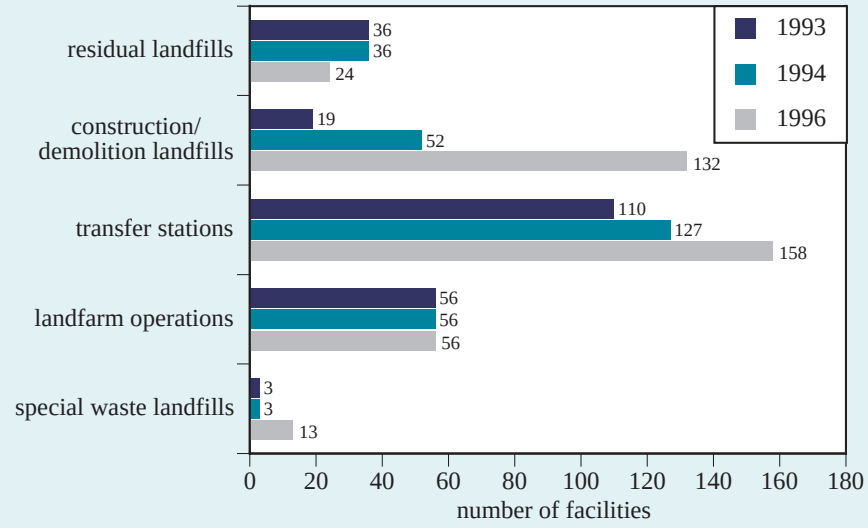
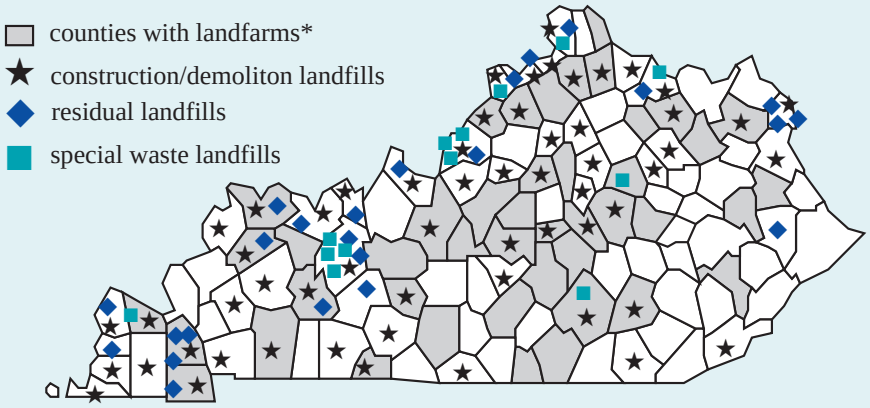
Figure 9 Other Solid Waste Management Facilities in KY



Source: KY Division of Waste Management

Figure 10 Other Solid Waste Management Facilities in Kentucky



**Petroleum contaminated soil remediation landfarms in Webster, Simpson, and Campbell counties. Compost special waste landfarms in McCracken, Simpson, Morgan counties. Landfarms that spread food or other types of waste in Henderson, Adair, Garrard, Oldham and Carter counties. Remaining facilities landfarm biosolids. Source: KY Div. of Waste Management*

of waste during construction. All CDDs less than one acre must post a $10,000 bond. Bonds for CDDs greater than one acre are based on the size of the site and average $10,000 to $15,000 an acre. During fiscal year 1995-96, 592,048 tons of waste were disposed at the 21 CDDs greater than one acre, diverting about 12% of the waste stream from contained MSW landfills.[7] Data on how much waste is disposed at CDDs less than one acre is not required to be reported.

The number of solid waste transfer stations has increased due to the closure of many landfills and the permitting of larger, regional MSW landfills. In 1995, 725,134 tons of waste were reported processed at 158 transfer stations.

The number of solid waste transfer stations has increased due to the closure of many landfills and the permitting of larger, regional solid waste disposal facilities. In 1995, 725,134 tons of waste were reported processed at 158 transfer stations.

Special Waste Landfills Increase to 13 While Residual Landfills Decline

During 1995, 24 residual landfills reported disposing 739,242 tons of waste. The construction and operating requirements for residual landfills and the amount of financial assurance bonds are determined on a case-by-case basis. However, all sites must monitor groundwater. Of the 24 residual landfills with permits, five have confirmed groundwater contamination and are in the process of conducting assessments to verify the extent of contamination **(Figure 11)**.

The number of residual solid waste landfills is declining as several transition to special waste landfills **(Figure 9)**. The special waste landfill was created as a separate regulatory category in 1992 to dispose of high-volume low hazard wastes, such as fly ash generated by power plants. Special waste landfills require less stringent construction and operating requirements than residual landfills, although they are required to monitor groundwater. There are 13 special waste landfills with permits to dispose fly ash generated by power plants. These landfills are typically 50 to 100 acres. Special waste landfills received transition permits in Feb. 1996. Data is not available from the Division of Waste Management on the amount of special waste disposed at these sites or groundwater monitoring results.

There are 13 special waste landfills with permits to dispose fly ash generated by power plants. These landfills are required to monitor groundwater and are typically 50 to 100 acres. Special waste landfills received transition permits in Feb. 1996.

Most Wastewater Sludge Disposed of in Landfills

The spreading or landfarming of certain wastes on the land is considered a beneficial reuse of wastes since it adds nutrients back to the soil. The number of landfarm operations has remained unchanged since 1993 **(Figure 9)**. Landfarm operations must test materials for various metals including copper, lead, selenium, arsenic, cadmium, zinc, chromium, nickel, and mercury. If these metals exceed certain lev-

During 1995, the 24 residual landfills operating in the state reported disposing 739,242 tons of waste. All must monitor for groundwater contamination. Five of the residual landfills have confirmed groundwater contamination and are conducting assessments to verify the extent of contamination.

Figure 11 Status of Residual Landfills in Kentucky

Landfill	County	GW Monitoring	Contaminants Detected
Westvaco	Ballard	yes	
Bavarian Trucking	Boone	yes	
A.K. Steel	Boyd	yes	
Ashland Petroleum	Boyd	yes*	barium, chromium
Pittsburgh Activated Carbon	Boyd	yes	
IMCO	Butler	yes	
City of Murray	Calloway	yes*	chloroethane, TCE, vinyl chloride, etc.
Westvaco	Carlisle	yes*	chromium, arsenic, barium (gross alpha & gross beta naturally occurring)
DOW Corning	Carroll	yes	
Dayton Walther Corp.	Carroll	yes	
Addwest Mining Inc.	Daviess	yes	
Costain Coal Inc.	Floyd	yes	
Willamette Industries	Hancock	yes	
Alcan Ingot & Recycling	Henderson	yes*	chlorides
E.I. DuPont	Jefferson	yes	
Air Products & Chemicals	Marshall	yes**	
ISP Chemicals	Marshall	no	
SKW Alloys	Marshall	yes	
Mason Co. Fiscal Court	Mason	yes*	barium
Olin Chemicals	Meade	yes	
Reed Minerals	Muhlenberg	yes	
Pyramid Mining Inc.	Ohio	yes	
Zielinski Construction	Ohio	yes	
J. Smith Coal/Costain Coal	Webster	yes	

**Groundwater contamination confirmed; in assessment. **Additional groundwater wells to be installed.*

Source: KY Division of Waste Management

els, the landfarm must monitor groundwater. The four landfarm operations required to monitor groundwater have not detected contamination caused by the operations.

Forty-eight of the 56 landfarm operations in Kentucky have permits to spread sludge generated by wastewater treatment plants. During 1995, 5,644 tons of sludge, or about 12% of the total generated in Kentucky, was landfarmed.

Forty-eight of the 56 landfarm operations have permits to spread biosolids generated by wastewater treatment plants. However, most of the sludge generated by the 2,289 wastewater treatment plants operating in Kentucky is disposed of in landfills. A 1993 University of Kentucky state study found that wastewater plants generate an average of 47,351 tons of sludge annually.[8] During 1995, 5,644 tons of sludge, or about 12% of the total generated in Kentucky, was landfarmed.

Three operations have permits to landfarm petroleum contaminated soil, three landfarms compost special waste, and five are permitted to landfarm food, rendering waste, or other types of waste. Thirty-seven of the landfarm permits have been issued to municipalities with the remainder to private companies.

The low number of landfarms in Kentucky may be due to several factors including competition from MSW landfills, whose tipping fees have been comparable to the costs for landfarming waste. Landfarm permit fees for private operations, which can be as high as $6,000, may have also discouraged operations, according to some consultants. As MSW landfill rates continue to rise, additional interest in landfarming may increase. The average cost to landfarm waste in Kentucky is $15 per ton.

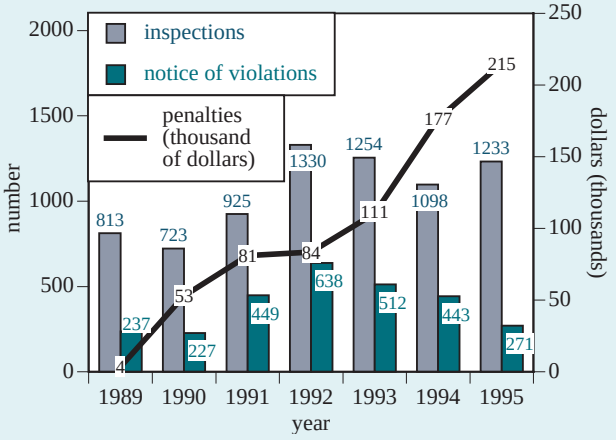
Requirements to prevent contamination of land and water from landfarming also may have limited operations in the state, according to Division of Waste Management officials. Landfarm operations must meet strict siting requirements to prevent potential surface and groundwater contamination. These requirements include buffer zones near streams and sinkholes, and slope requirements to prevent runoff. Siting

restrictions have particularly limited landfarms in Eastern Kentucky, where little flat land exists. While opportunities to landfarm waste on coal mines exists, there have been few operations to date.

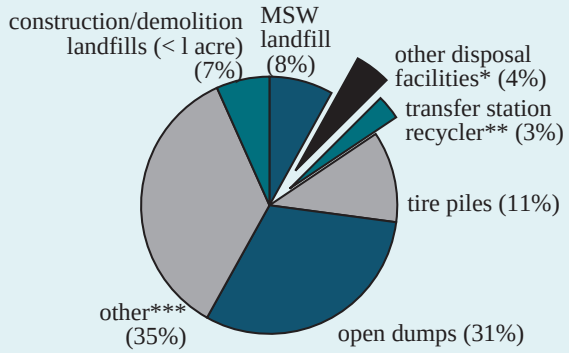
Solid Waste Violations Decline 58% Since 1992

A review of solid waste enforcement and compliance trends reveals that the number of violations cited by state officials fell 58% between 1992 and 1995. The decline is attributed to the closure of many landfills and the upgrading of others to meet new solid waste rules. A closer look at the 271 solid waste violations cited by state officials in 1995 found that tire piles and open dumps received 42% of the citations **(Figure 12)**. But trends also show that penalties have increased in the past four years. During 1995, 27 facilities were assessed fines. The penalties, collected against landfills, transfer stations, and private waste facilities ranged from $100 to $30,000.

Figure 12 Solid Waste Enforcement and Compliance Trends



Violations By Type (1995)



**Permitted CDDs (>1 acre), residual, special waste, landfarms, compost facilities. **Commercial recyclers. ***Includes junkyards, sawdust piles, oil and brine pits, septic tanks, convenience centers, road oiling, sludge give away.*
Source: KY Division of Waste Management

A review of solid waste enforcement and compliance trends reveals that the number of violations cited by state officials fell 58% between 1992 and 1995. A closer look at the 271 violations cited in 1995 found that tire piles and open dumps received 42% of the citations. But trends also show that penalties have increased in the past four years. During 1995, 27 facilities were assessed fines.

More Kentuckians Participating in Garbage Collection

State law now requires counties to provide residents with garbage collection services. All counties have adopted ordinances to provide for garbage collection, although most are voluntary in nature. To date, 19 counties have passed ordinances requiring mandatory participation in garbage collection **(Figure 13)**.

In 1995, an estimated 1.17 million Kentucky households, about 80% of the state total, participated in a garbage collection program. This is 161,000 more households than was the case in 1993 **(Figure 14 & 15)**. Door-to-door garbage collection programs are increasing as well. A number of communities in 118 counties have access to door-to-door collection of waste. However, data is not available to determine the number of communities or population served by these programs.

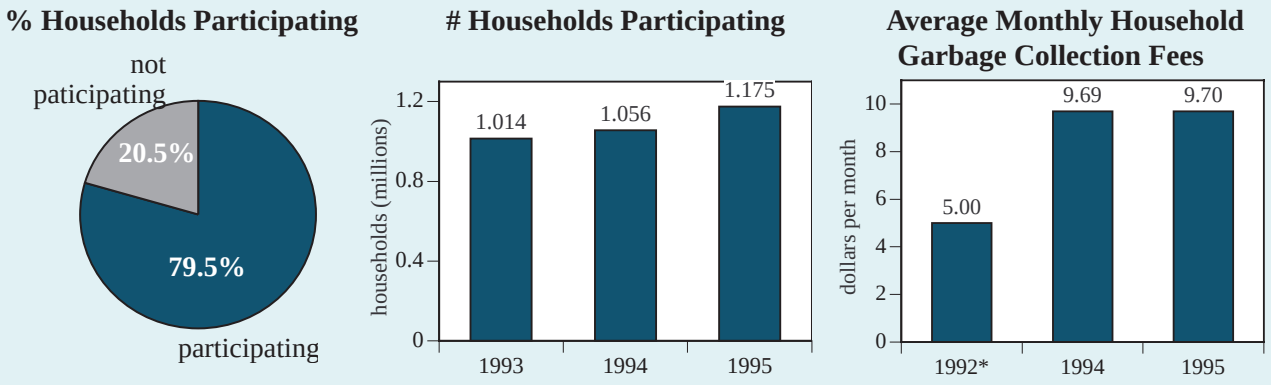
Household garbage collection rates continue to rise as a result of increasing landfill tipping fees and transportation costs. Household garbage collection rates have nearly doubled since 1992 and now average $9.70 per month **(Figure 14)**. However, rates vary greatly across the state, from $3 a month in Garrard County to a high of $15 per month in Logan County.

All counties have adopted ordinances to provide for garbage collection, although most are voluntary in nature. To date, 19 counties have passed ordinances requiring mandatory participation in garbage collection.

Figure 13 Mandatory County Garbage Collection Ordinances

Bell	Letcher
Breathitt	McCreary
Elliott	Magoffin
Floyd	Marion
Franklin	Meade
Greenup	Nelson
Harlan	Perry
Johnson	Pike
Knott	Washington
Lee	

Figure 14 Households Participating in Garbage Collection and Garbage Fees in KY



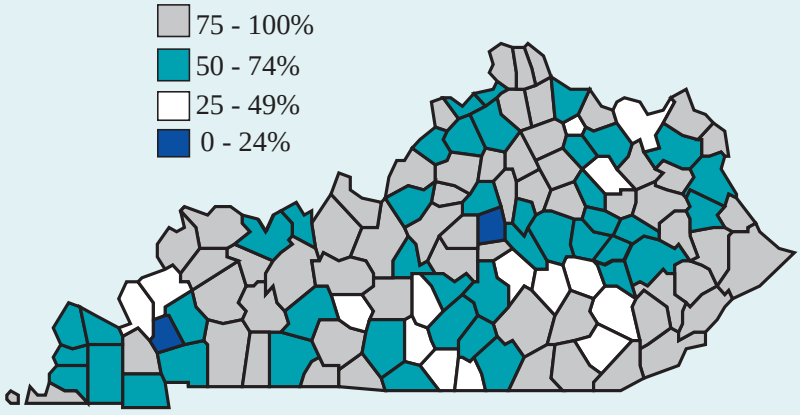
**Estimate. Source: KY Division of Waste Management*

In 1995, an estimated 1.17 million households, about 80% of the state total, participated in a garbage collection program. This is 161,000 more households than was the case in 1993.

Household garbage collection rates have nearly doubled since 1992 and now average $9.70 per month. Garbage rates vary greatly across the state, from $3 a month in Garrard County to $15 per month in Logan County.

A statewide hotline (1-888-no-dump) was established in April 1996 to provide Kentuckians an opportunity to report open dumps to state and local officials. During a five-month period, April 22 through Sept. 19, 345 calls had been made by citizens to the open dump hotline.

Figure 15 Households Participating in Garbage Collection(1995)



Source: 1995 County Solid Waste Reports

Open Dump Cleanups Increasing, 4,379 Citations Issued in 1995

Kentucky faces a significant challenge when it comes to curtailing open dumping. With 20% of Kentucky's households still disposing of their garbage illegally, the number of open dumps increases each year. State and local efforts to identify and clean up open dumps have progressed **(Figure 16)**. In 1995 alone, 1,761 dumps were cleaned up at an average cost of $2,135 per dump.

In 1996, the Natural Resources and Environmental Protection Cabinet initiated a campaign to stop illegal dumping. The Cabinet has joined with other agencies to promote greater public awareness of the threats posed by illegal dumping and to step up enforcement of open-dump laws. A statewide hotline (1-888-no-dump) was established in April 1996 to provide Kentuckians an opportunity to report open dumps to state and local officials. During a five-month period, April 22 through Sept. 19, 345 calls had been made by citizens to the open-dump hotline.

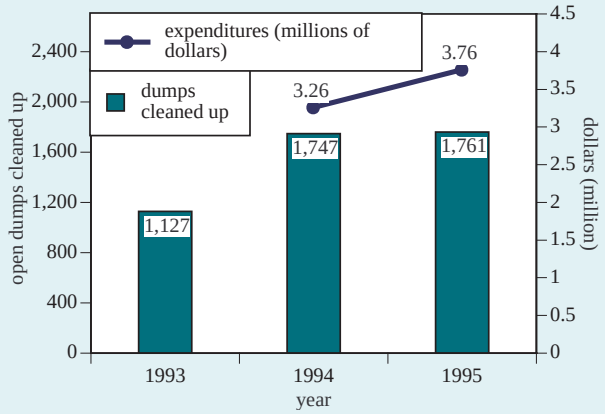
Many counties have appointed local solid waste coordinators to promote proper solid waste management. The number of counties with solid waste coordinators has increased from 40 in 1992 to 88 in 1995 **(Figure 17)**.

Eighty-five counties have enacted open dump ordinances to give the county authority to cite and prosecute violators. Local solid waste coordinators have taken the lead in enforcing open-dump ordinances **(Figure 18)**. In Leslie County for example, the solid waste coordinator cited 404 violations of the local open-dump ordinance in 1995. Jefferson County officials issued 682 open-dump violations during 1995. Most of the 4,379 open-dump violations cited by local officials during

1995, were resolved out of court. Only 1,257, or 29%, resulted in court action.

Some solid waste coordinators have developed innovative approaches to deal with the open dump problem. In Jackson County, two officers were hired to issue citations for illegal dumping. The county has already seen results with an increase in the amount of waste being processed at the local transfer station. Scott and Boone County have programs to help property owners fund the clean up of dumps and sinkholes. And the LaRue County Solid Waste Coordinator requires violators to issue public apologies in newspapers and watch videos about the hazards of dumping.

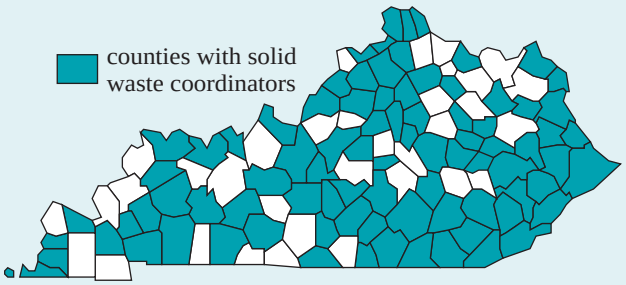
Figure 16 Open-Dump Cleanups and Expenditures in Kentucky



Note: Earlier data not available.

With 20% of Kentucky's households still disposing of their garbage illegally, the number of open dumps increases each year. State and local efforts to identify and clean up open dumps have progressed. In 1995 alone, 1,761 dumps were cleaned up at an average cost of $2,135 per dump.

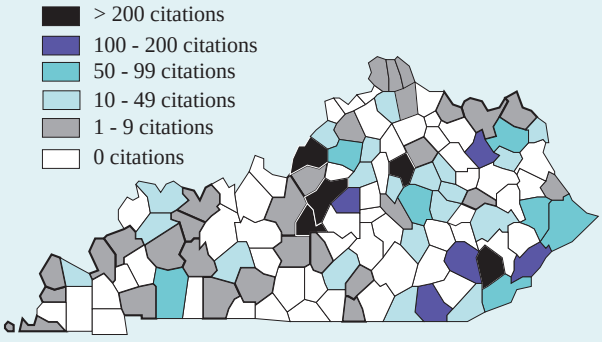
Figure 17 Counties With Solid Waste Coordinators (1995)



Source: KY Division of Waste Management

Many counties have established local coordinators to promote proper solid waste management and curb open dumping. Since 1992, the number of counties with solid waste coordinators has increased from 40 to 88.

Figure 18 Open-Dump Violations (1995)



Source: 1995 County Solid Waste Reports

Most of the 4,379 open-dump violations cited by local officials during 1995 were resolved out of court. Only 1,257, or 29%, resulted in court action. Some county solid waste coordinators have developed innovative approaches to deal with the open-dump problem.

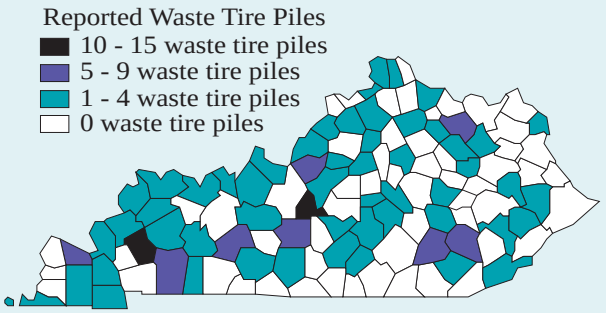
Tire Piles Growing, State Cleans Up Six Largest in 1996

There are 193 known waste-tire dumps in 87 counties **(Figure 19)**. An estimated 7 to 10 million waste tires at these sites pose health and environmental threats. For example, tire piles are breeding grounds for mosquitoes, including the Asian Tiger Mosquito, a carrier of two types of encephalitis. And each year tire fires emit toxic chemicals into the air and water. In 1994 and 1995, 10 waste tire fires were reported in Kentucky.

Waste-tire disposal remains a major problem in the Commonwealth. In addition to the 10 million estimated tires stockpiled across the state, Kentuckians produce another 3.8 million waste tires each year. While state regulations allow for the disposal of shredded tires at solid waste landfills, few accept them due to space restrictions. So, many tires wind up in piles or are trucked to Ohio and Illinois for use as a tire-derived fuel.

There are 193 known waste-tire dumps in 87 counties. An estimated 7 to 10 million waste tires at these sites pose health and environmental threats. The Natural Resources and Environmental Protection Cabinet recently awarded six contracts in 1996 to clean up six tire piles containing 1.8 million tires at a cost of $1.6 million.

Figure 19 Waste Tire Dumps in KY (1995)



Source: KY Division of Waste Management

Figure 20 Cleanup of Waste Tire Piles in Kentucky (1996)

Site (County)	# tires
Windy Ridge (Campbell)	350,000
H. Lindsey (Barren)	657,000
G. Ridge* (Campbell)	150,000
Tire Power (Franklin)	51,000
Enconne (Logan)	225,000
Law-Mac (Franklin/Simpson)	390,000
Total	**1,823,000**
Cost to Clean up Sites	**$1,600,000**

**awaiting cleanup*

The Natural Resources and Environmental Protection Cabinet awarded six contracts in 1996 to clean up six tire piles containing 1.8 million tires at a cost of $1.6 million **(Figure 20)**. Most of the tires were shipped to the Illinois Power Company for use as a tire-derived fuel or to Indiana for landfill construction. There are no facilities in Kentucky permitted to use waste tires for fuel at this time, although a final determination was made Aug. 1996 to grant Cox Interior Inc. an air permit to modify its heat exchangers to burn multiple fuels including waste tires at its wood-products plant in Campbellsville.

State funds used to clean up tire sites are generated by a $1 fee on new tires sold in the state. The KY Waste Tire Fund, established in 1990, generates about $600,000 a year. As of June 30, 1996, the fund had collected $3.4 million (plus $345,524 in interest) for tire dump cleanups and grants to county governments to purchase tire shredders and recycling equipment. It was hoped that the fee would generated $3.6 million annually, however, a fee exemption for retailers who recycle waste tires has limited the funds needed to clean up sites. The Cabinet is developing regulations for financial assurance, tracking and reporting requirements, and management standards to better enforce the tire fee exemptions for retailers.

The Cabinet is also exploring other tire disposal options including use as artificial reefs in lakes, landfilling, and as a fuel source in power plants. While recycling is also an option, current markets for waste tires at this time appear limited.

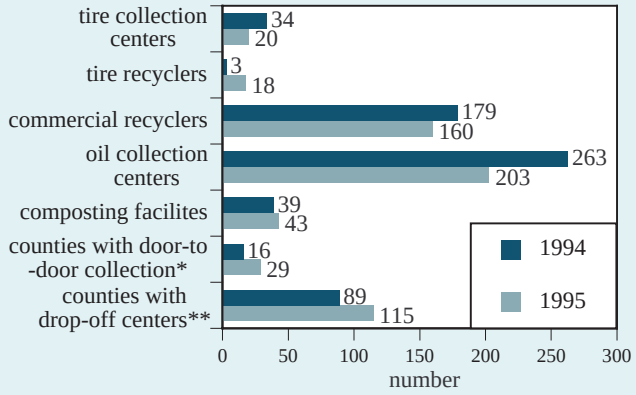
Recycling Programs and Collection Increasing

Kentucky established a statewide goal to reduce the amount of solid waste disposed at landfills 25% by 1997. Data reported by counties reveal that in 1995, 971,713 tons of materials were collected for recycling along with 190,687 tons of yard waste, diverting about 24% of the municipal waste stream from landfills.

Prior to the 1993 state law mandating local solid waste management plans, few counties operated recycling programs. There was little infrastructure in existence to process these commodities and few markets in which to sell the recovered materials. According to 1995 county solid waste reports, all but five counties (Edmonson, Knott, Monroe, Washington, and Wolfe) now have established drop-off centers for recyclables, compared to 89 counties in 1994 **(Figure 21)**.

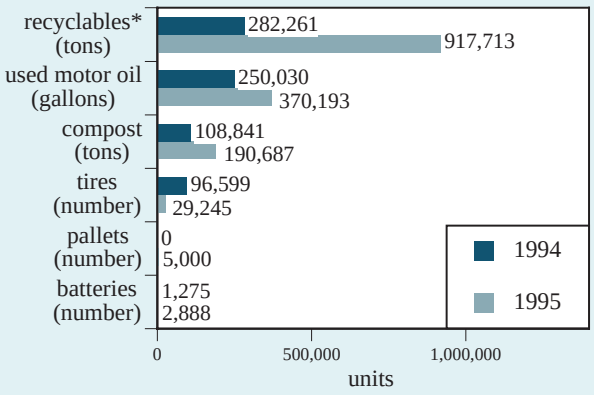
Nationwide, the U.S. EPA estimates that recycling and composting recovered 24% of the municipal solid waste in 1994, up from 21% in 1993 and 17% in 1990. Kentucky established a statewide goal to reduce the solid waste disposed at landfills 25% by 1997. Data reported by counties reveal that in 1995, 971,713 tons of materials were collected for recycling along with 190,687 tons of yard waste, diverting about 24% of the municipal waste stream from landfills **(Figure 22)**. There are 43 compost facilities permitted in Kentucky. State officials estimate that these facilities processed 207,000 tons of compostable materials during 1995, close to what was reported in the county solid waste reports.

Figure 21 Recycling Facilities/Programs in KY



**Counties where one or more communities have door-to-door recycling collection. **Counties with one or more recycling drop-off centers. Source: KY Div. of Waste Management*

Figure 22 Collection of Recyclables in KY

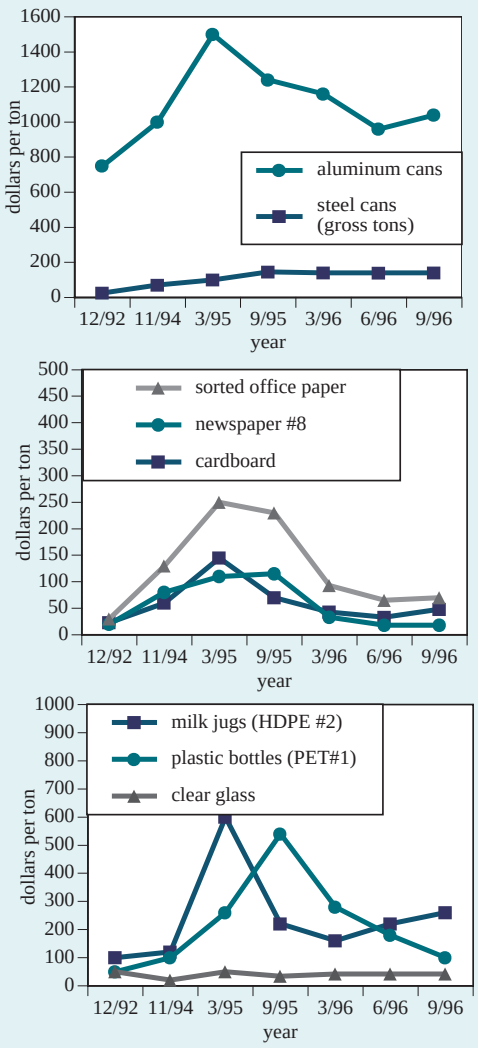


**Aluminum, newspapers, cardboard, paper, glass, plastic. Source: 1994-1995 County Solid Waste Reports which include data on public and private sector collection, where available.*

In communities with curb-side recycling programs, collection rates vary. Louisville reports that 76% of the city's households participate in curb-side recycling, diverting about 14% of the waste stream from landfills. City officials expect to collect 13,000 tons of recyclables in 1996 compared to 9,500 tons in 1993. The U.S. EPA estimates that commercial sources also generate 35% to 45% of the municipal solid waste stream. Nationwide recycling levels for commercial sources are estimated at 27%.

Some communities are trying innovative projects to encourage more waste reduction. The Northern Kentucky Solid Waste District reports that 30 families were involved in a pilot program called "Don't Bag It" in Florence, Ft. Thomas, and Edgewood this summer. Volunteer families were given the use of a new mulching mower with the option to purchase the mower at a reduced price. The families diverted 30 tons of yard waste from landfills.

Figure 23 Prices for Recyclables



Source: KY Recycling and Marketing Assistance

Prices for Recyclables Plunge in 1996

Markets, as well as market fluctuations, remain the greatest barriers to recycling. Fueled, in part, by government and business buy-recycled programs, prices for recyclables reached all-time highs in 1994 and 1995. Then demand and prices fell due to oversupply, economics, and changes in federal procurement rules **(Figure 23)**.

Some counties have joined together to create five regional recycling partnerships to better market recyclables in Kentucky. The Tri-County recycling partnership (Henderson, Union, and Webster counties) established a recycling center in 1993. The center collected 1,162 tons of recyclables in 1995 and generated almost $30,000 in revenues. The Bluegrass Regional Recycling Corp. (consisting of 22 counties and 29 cities) collected 36,000 tons of recyclables since 1990 while also creating 30 new jobs.

While recycling is an important part of the hierarchy of waste management, attention is now shifting to waste reduction. The U.S. EPA has begun to encourage municipalities to adopt so-called "pay as you throw" (PAYT) programs, which charge citizens individually for waste services based on

the amount of garbage they produce. Nationwide, more than 2,000 communities have adopted PAYT programs, although none are located in Kentucky. Initial research reveals that waste reduction in those communities with PAYT programs ranged from 25% to 45%.[9] But there are issues associated with PAYT programs such as affects on low-income residents and concern about increased illegal dumping.

Hazardous Waste

The management and disposal of hazardous waste is regulated under the provisions of the Resource Conservation and Recovery Act of 1976, known as RCRA, and its amendments. Kentucky's hazardous waste laws and regulations have been in place since 1982. The regulation of hazardous waste is considered one of the most comprehensive sets of rules governing the protection of the environment, seeking to manage every aspect of hazardous waste, from cradle to grave.

Generation of Hazardous Waste Remains Constant at 6.5 Million Tons

Federal and state hazardous waste laws have primarily focused on managing waste produced by large generators. Large quantity generators produce:

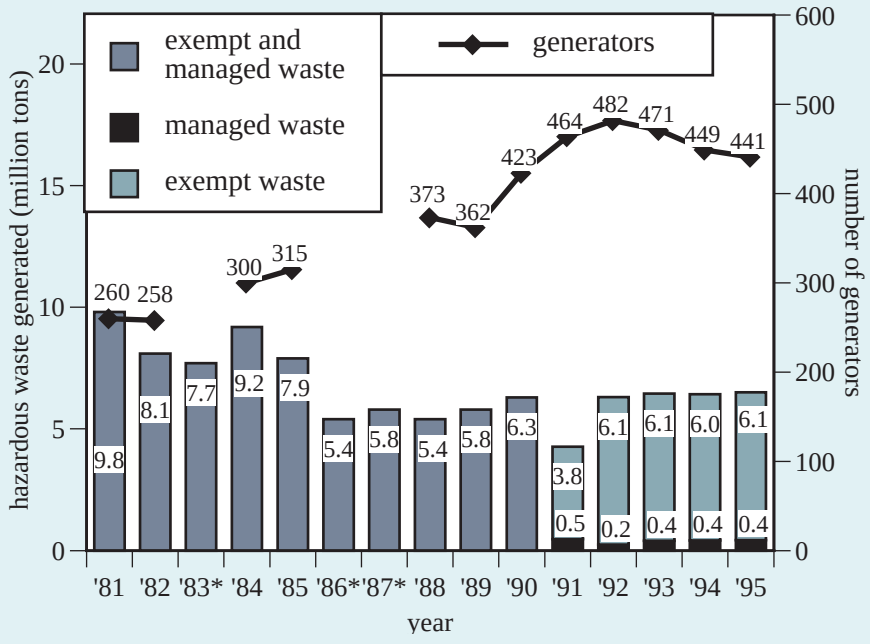
- 2,205 pounds of hazardous waste a month, or
- 2.2 pounds or more of acutely hazardous waste a month, or
- 220 pounds of spill cleanup materials a month.

In 1995, 441 large-quantity generators reported producing 6.5 million tons of hazardous waste **(Figure 24)**. The amount of hazardous waste generated in the state has remained fairly constant for the past several years except for 1991 which saw a drop due to the redesignation of calcium sulfate to a by-product.

The treatment and disposal of hazardous waste depends on the type of waste produced **(Figure 25)**. There is managed hazardous waste which includes toxic wastes and waste of greater hazard subject to permitting requirements. In 1995,

In 1995, 441 large-quantity generators reported producing 6.5 million tons of hazardous waste. While some companies have made the reduction and recycling of hazardous waste a priority, it would appear that little statewide progress has been made in the past decade in reducing the total amount of hazardous waste produced in Kentucky.

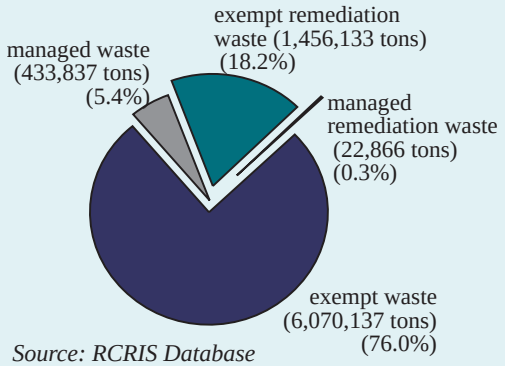
Figure 24 Hazardous Waste Generation in Kentucky



*Note: Does not include remediation waste. Totals rounded. *Generator data not available.*
Source: RCRIS Database

433,837 tons of managed hazardous waste were generated. Most of the waste produced, 6.1 million tons, was corrosive wastewater. This waste is considered a low risk and its treatment and disposal is exempt from most hazardous waste permitting requirements. In 1995, 1.47 million tons of remediation waste was also generated from the clean up of spills and waste sites.

Figure 25 Types of Hazardous Waste Generated in KY (1995)



Source: RCRIS Database

The treatment and disposal of hazardous waste depends on the type of waste produced. There is managed hazardous waste which includes toxic wastes and waste of greater hazard subject to permitting requirements. In 1995, 433,837 tons of managed hazardous waste were generated. Ten companies generated or handled 80% of the managed hazardous waste in the state.

Trends show that the amount of managed hazardous waste subject to permitting requirements has remained the same since 1993 **(Figure 24)**. In 1995, ten companies generated or handled 80% of the managed hazardous waste in the state **(Figure 26)**. The amount of exempt hazardous waste has remained about the same since 1992. Ten generators accounted for 90% of the exempt hazardous waste produced in 1995 **(Figure 27)**.

Because of hazardous waste reclassifications and other regulatory changes made from year to year, it is difficult to determine whether Kentucky is moving toward its statewide waste-reduction goal of 25% by 1997, based on 1988 levels. While some companies have made reduction and recycling of hazardous waste a priority, it would appear that little overall statewide progress has been made by large quantity generators in reducing the total amount of hazardous waste produced in Kentucky.

Most Hazardous Waste Treated On-Site

Much of the hazardous waste produced in Kentucky is chemically neutralized on-site to render it nonhazardous **(Figure 28)**. During 1995, 99% of the hazardous waste was treated at the site of generation. Most is treated and discharged to waterways under conditions specified in state water permits.

There are three hazardous waste incinerators operating in Kentucky; Elf Atochem at Calvert City and Carrollton and LWD in Calvert City. LWD operates the only commercial hazardous waste incinerator **(Figure 29)**. The state denied the LWD incinerator permit in 1990, but a court order allowed the facility to continue to operate. Other state and federal litigation has caused further delays in the review of the permit application. A decision on the LWD permit is expected soon. Two facilities are also permitted to burn hazardous waste as a blended fuel in their industrial boilers. In 1995, KY Solite (Bullitt Co.) burned 4,634 tons and Rohm and Haas (Jefferson Co.) burned 12,996 tons of blended fuel.

Figure 26 Top 10 Generators/ Handlers of Managed Hazardous Waste

Company (County)	Tons 1990	Tons 1995
Ken Dec (Hart)	712	192,724
Safety Kleen*. (Henry)	43,744	83,576
Rohm & Haas (Jefferson)	20,006	13,196
LWD Inc.* (Marshall)	8,003	11,599
Universal Fast. (Anderson)	100,748	11,246
Envmtl. Conservation (Henderson)	19,449	9,331
Gallatin Steel (Gallatin)	**	7,632
ISP Chemical (Marshall)	9,350	6,585
NSA (Hancock)	761	5,901
James Graham Brown Foundation (Jefferson)	**	5,365
Total Top Ten	**202,773**	**347,155**
Total State	**471,136**	**433,837**

**Treatment, storage, disposal facility. ** Not operating. Source: RCRIS Database*

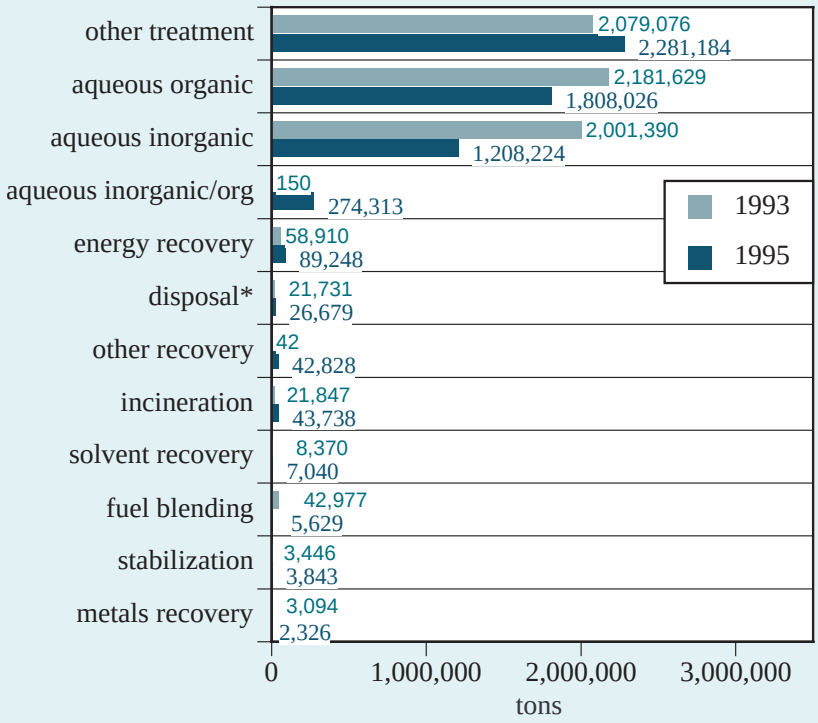
Figure 27 Top 10 Generators Exempt Hazardous Waste

Company (County)	Tons 1995
B.F. Goodrich (Marshall)	2,505,340
Elf Atochem (Marshall)	721,938
Westlake Monomers (Marshall)	716,044
Olin Corp. (Meade)	486,300
DOW Corning (Carroll)	283,495
B.F. Goodrich (Jefferson)	223,009
Coltech Ind. (Warren)	140,802
Gamco Products (Henderson)	137,610
Willamette (Hancock)	125,466
Englehard (Jefferson)	106,488
Total Top Ten	**5,446,492**
Total State	**6,070,137**

Source: RCRIS Database

Much of the hazardous waste produced in Kentucky is chemically neutralized on-site to render it nonhazardous. During 1995, 99% of the hazardous waste was treated at the site of generation.

Figure 28 Hazardous Waste Treatment and Disposal Methods in Kentucky



*Note: Large quantity generator waste. Does not include waste imported into KY for disposal or treatment because data is not available. Earlier data not available. *Landfills, waste piles, impoundments. Source: RCRIS Database*

LWD operates the only commercial hazardous waste incinerator. The state denied the LWD incinerator permit in 1990, but a court order allowed the facility to continue to operate. Other state and federal litigation has caused further delays in the review of the permit application. A decision on the LWD permit is expected soon.

Figure 29 LWD Hazardous Waste Incineration

Year	Tons
1992	30,912
1993	34,811
1994	45,750
1995	35,320

Source: LWD Inc.

Alternatives to Nerve Gas Weapon Incineration to be Studied

The U.S. Army's proposal to build an incinerator to burn chemical munitions such as nerve and mustard agents stored at the Bluegrass Army Depot in Richmond, Kentucky, continues to receive state and national attention. Approximately 70,000 obsolete rockets are stored at the depot. The U.S. Army has proposed to construct an on-site incinerator to destroy the weapons stored in Kentucky. The depot stockpile represents 1.6% of the nation's nerve gas weapons. Opposition to the army's plan has been voiced by city and county government officials, concerned citizens and others. The Army filed a permit application for the chemical munitions incinerator with the state in Dec. 1995.

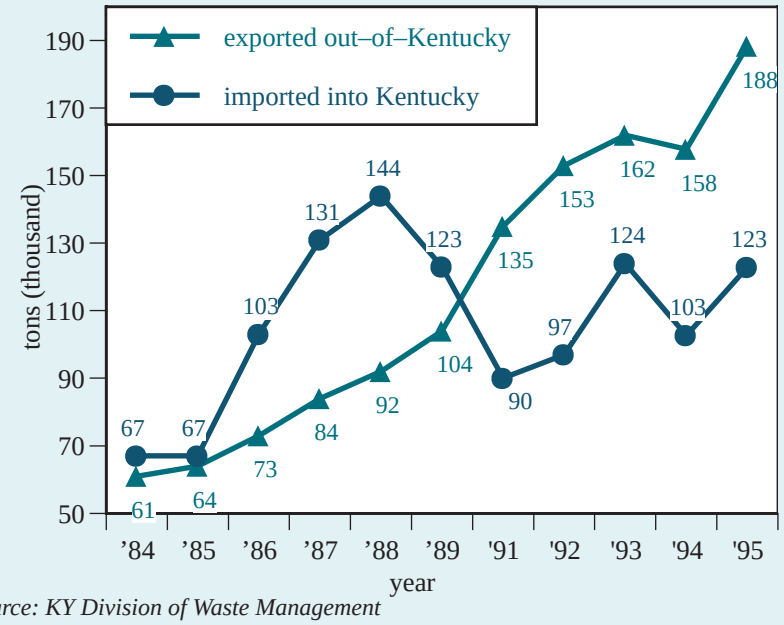
President Clinton recently indicated that he will order a study of alternative technologies for destroying the chemical weapon munitions and allocate $25 million to test these technologies in response to public concern about the safety of incineration. A $40 million research provision to have the Pentagon identify at least two alternatives to incineration was also included by Congress in the 1996-97 federal defense appropriations bill.

Kentucky Net Exporter of Hazardous Waste

Kentucky remains a net exporter of hazardous waste **(Figure 30)**. In 1995, 188,000 tons of hazardous waste generated in the state was shipped to 28 states for treatment or disposal.

During 1995, 85% of the 123,000 tons of hazardous waste imported into Kentucky was received by three facilities for treatment or disposal — Safety Kleen in Henry County and LWD Inc. and LWD Sanitary Landfill in Marshall County.

Figure 30 Hazardous Waste Imports and Exports in KY



Source: KY Division of Waste Management

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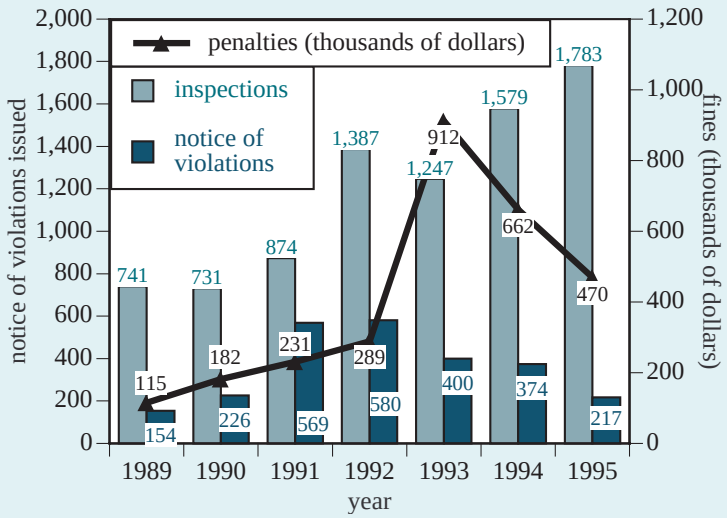
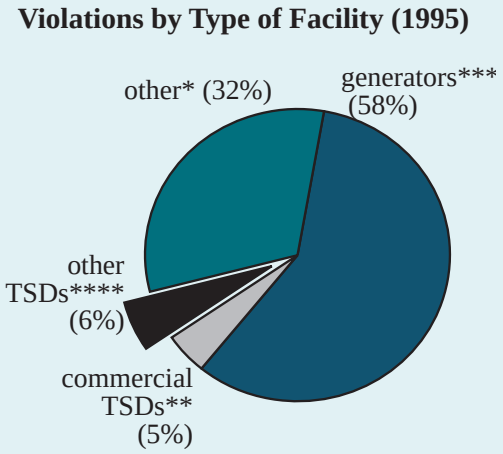
More Inspections, Fewer Hazardous Waste Violations Cited in 1995

Each year, the Division of Waste Management conducts inspections of generators and the 91 facilities that have permits to treat, store, or dispose of hazardous waste. Hazardous waste inspections have steadily increased since 1990, reaching a record high of 1,783 in 1995 **(Figure 31)**.

Although there were more inspections, the number of violations has decreased. Most hazardous waste violations were paperwork in nature, according to state officials. During 1995, 28 facilities were assessed fines, ranging from $500 to $100,000.

Figure 31 Hazardous Waste Enforcement and Compliance Trends in Kentucky





**Used oil marketers, transporters, non-notifiers, limited quantity generators, illegal disposal. **Permitted treatment, storage, disposal facilities that receive waste from off-site. ***Large and small quantity generators. ****Permitted treatment, storage, disposal facilities that process waste on-site. Source: KY Division of Waste Management*

563 New Potential Contaminated Waste Sites Identified in Past Two Years

Contaminated waste sites in Kentucky continue to pose threats to human and environmental health. In the past two years, more than 500 sites have been identified.

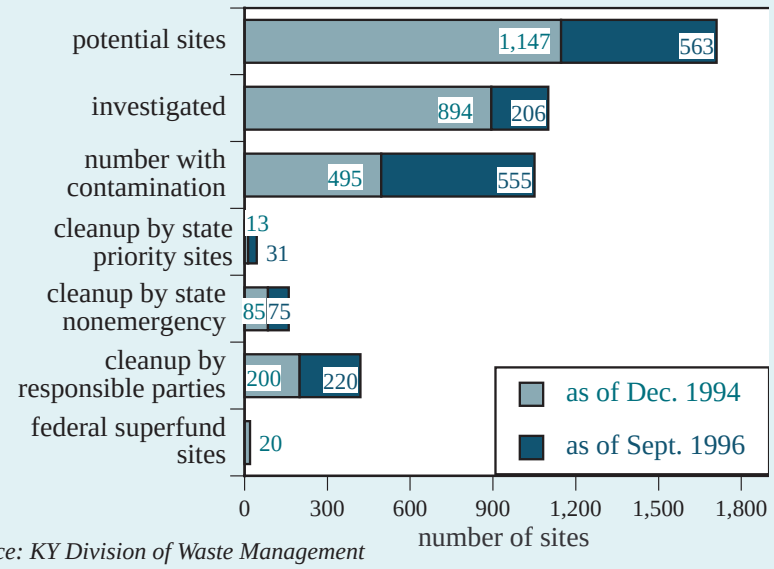
Contaminated waste sites continue to pose threats to human and environmental health. In the past two years, more than 500 sites have been identified. Reported waste sites in Kentucky now number 1,710. Investigations at 1,100 of these sites have confirmed contamination at all but 50 **(Figure 32)**. Waste sites are located throughout the state with the largest number in Jefferson County **(Figure 33)**.

Progress toward the clean up of contaminated waste sites continues. Since Dec. 1994, 220 sites have been addressed by responsible parties **(Figure 32)**. Another 160 sites had removal actions and 44 had more extensive cleanup activities conducted by the state in the past two years where the responsible party could not be identified or was financially unable to remediate the site.

State monies to address abandoned waste sites are provided through the KY Hazardous Waste Management Fund **(Figure 34)**. The fund, established by the General Assembly in 1981 and later amended in 1990, is financed through a fee on hazardous waste produced. Each year, about $2.2 million is collected from hazardous waste generators to finance the fund. But many sites remain in need of cleanup and hundreds of new sites are discovered each year. Resources and personnel to address these sites are limited. The state is only able to address about 22 sites a year. Currently, 25 high-priority sites are now in some stage of remediation **(Figure 35)**.

Reported waste sites in Kentucky now number 1,710. Investigations at 1,100 of these sites confirmed contamination at all but 50. Progress toward the clean up of contaminated waste sites continues. Since Dec. 1994, 220 sites have been remediated by responsible parties.

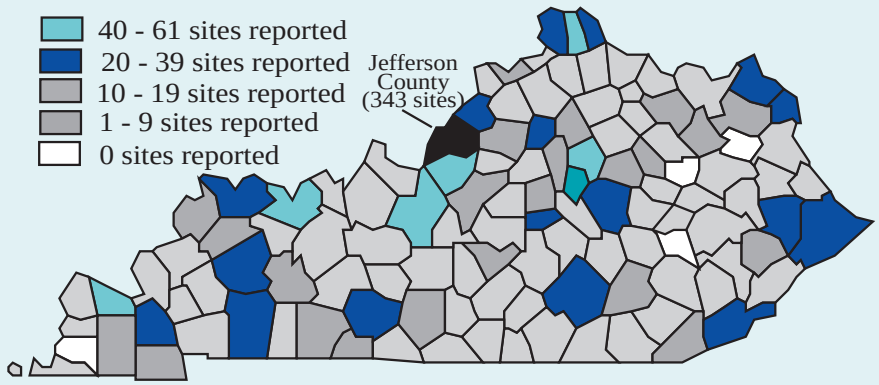
Figure 32 Status of Contaminated Waste Sites in Kentucky



Source: KY Division of Waste Management

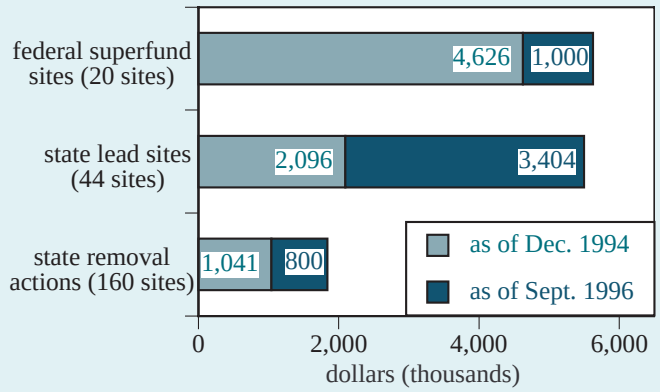
Waste sites are located throughout the state. The largest number of reported sites, 343 is in Jefferson County.

Figure 33 Reported Contaminated Waste Sites in KY (1995)



Note: Contaminated or potentially contaminated sites. Source: KY Div. of Waste Management

Figure 34 Expenditures from Kentucky Hazardous Waste Management Fund



Source: KY Division of Waste Management

State monies to address abandoned waste sites are provided through the Kentucky Hazardous Waste Management Fund. The fund is financed from a fee on hazardous waste generated and collects $2.2 million a year.

290,155 Kentuckians Live Within 4 Miles of a Federal Superfund Site

Twenty of the 1,227 federal NPL (national priority list) federal Superfund sites are located in Kentucky. Federal NPL Superfund sites are considered the country's worst contaminated sites. An assessment conducted by EQC of the 20 federal NPL Superfund sites located in the state using Landview II, a mapping software program, found that 290,155 Kentuckians, or 8% of the state's population, live within a four-mile radius of a contaminated site, of which 42,389 are children nine years of age and younger **(Figure 36)**. Eight of the 20 sites are located in areas where the median household income is below the state average.

The U.S. EPA has primary authority for ensuring the clean up and management of federal Superfund sites. Progress, while often times slow, has been made toward the containment or remediation of Kentucky's 20 federal Superfund sites. Cleanup activities at six sites — A.L. Taylor (Valley of the Drums), Lee's Lane Landfill, Newport Dump, Howe Valley, Distler's Farm, and Distler's Brickyard — have been completed and the sites are now in long-term maintenance.

For many federal Superfund sites, monitoring and maintenance will last for many years. For example, Maxey Flats, a federal Superfund site in Fleming County, will likely be monitored for hundreds of years. Four hundred responsible parties recently agreed to pay $60 million to contain the 4.75 million cubic feet of mostly low-level radioactive waste disposed at Maxey Flats during 1963 to 1977. It could take as long as 35 to 100 years for the disposal cells to settle before a permanent cap is constructed at the site. In the meantime, workers will remove 3 million gallons of contaminated water and install temporary plastic covers at the site.

The federal Superfund law has been the subject of intense national debate. The program has been criticized for the length of time, costs, and remedies used to clean up sites, mismanagement of sites, responsible party liability, and other legal issues. Fourteen years after the law was enacted, only 304 of the 1,227 NPL Superfund sites (23%) had cleanups completed.[10] The average cost to clean up a Superfund site is $30 million. Last year, the U.S. EPA announced 20 reforms to make the program more efficient. Congressional efforts to reform the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, otherwise known as Superfund), has been ongoing since 1994. Several bills have been introduced to reform the Superfund law by reducing litigation, requiring greater consideration of the future uses of the site in assessing risk and selecting cleanup remedies, and reducing costs while speeding cleanups.

Figure 35 Priority Contaminated Waste Sites in KY

County	Site
Boyd	Johnson Fork Dump
Bullitt	Mudd Property
Carlisle	Deena Products
Crittenden	Hunts Hardwoods
Fayette	Tobacco States
Fleming	Maxey Flats*
Franklin	Environment Salvage & Recycling
Grayson	Sawdust Fire
Greenup	Jeff Meade Landfill**
Hardin	Kent Records Industrial Haulers***
Hopkins	Jesse Gibson
Jefferson	Exmet Shively Battery Dump
Kenton	Bank Lick Creek Donaldson Art Sign
Lawrence	Roe Creek Landfill**
Marion	Allen Chemical***
McCracken	Rottgering Well
Meade	Derby Tank & Car
Muhlenberg	Primary Recovery***
Nelson	BC Battery
Warren	Rad Chemical
Woodford	Caldwell Burn Site

**Federal Superfund site*
***Old landfill*
****Responsible party to conduct cleanup.*
Source: KY Division of Waste Management

The U.S. EPA has primary authority for ensuring the cleanup and management of federal Superfund sites. Progress, while often times slow, has been made toward the containment and remediation of Kentucky's 20 federal Superfund sites. Cleanup activities at six sites — A.L. Taylor (Valley of the Drums), Lee's Lane Landfill, Newport Dump, Howe Valley, Distler's Farm and Distler's Brickyard — have been completed and the sites are now in long-term operation and maintenance.

For many federal Superfund sites, monitoring will last for years. Maxey Flats, a Superfund waste site in Fleming County, will likely be monitored for hundreds of years.

Figure 36 Status of Federal Superfund Sites in Kentucky

Site	Listed	Population 4 miles*	Median Income**	Cleanup Phase	Cleanup Cost dollars***
A.L. Taylor-Valley of Drums Brooks–Bullitt Co.	1981	42,178	$27,838	O&M	$800,000
B.F. Goodrich/Airco (2 sites) Calvert City–Marshall Co.	1982	4,430	$24,585	remedy designed	$1.3 million
Distler Brickyard West Point–Hardin Co.	1982	2,558	$17,997	O&M	$7.4 million
Distler Farm Louisville–Jefferson Co.	1982	4,048	$19,528	O&M	$1.2 million
Lee's Lane Landfill Louisville–Jefferson Co.	1982	49,028	$26,687	O&M	$2.2 million
Newport Dump Wilder–Campbell Co.	1982	94,183	$24,730	O&M	$516,000
Smith's Farm Brooks–Bullitt Co.	1984	20,595	$29,504	cleanup underway	$26.4 million
Maxey Flats Hillsboro–Fleming Co.	1986	1,948	$21,808	remedy selected	$60 million
Howe Valley Howe Valley–Hardin Co.	1987	1,675	$15,542	O&M	$345,525
Red–Penn Sanitation Co. Peewee Valley–Oldham Co.	1989	17,038	$36,712	no action deferred to state****	----
Tri–City Indstrl. Disp. Site Brooks–Bullitt Co.	1989	8,221	$24,923	cleanup underway	$3 million
Brantley Landfill Island–McLean Co.	1990	1,884	$17,871	remedy designed	$1.5 to $4.2 million
Caldwell Lace & Leather Auburn–Logan Co.	1990	1,361	$20,703	no action deferred to state	----
Fort Hartford Coal Olaton–Ohio Co.	1990	767	$16,750	remedy selected	$8.9-10.3 million
General Tire & Rubber Mayfield–Graves Co.	1990	8,078	$18,510	no action deferred to state****	----
Green River Disposal Site Maceo–Daviess Co.	1990	2,381	$22,623	cleanup underway	$11 million
Paducah Gaseous Diff. Plant Paducah-McCracken Co.	1992	7,960	$28,721	site study	not determined
National Southwire Alum. Hawesville-Hancock Co.	1992	12,572	$23,926	site study	not determined
National Elec. Coil Dayhoit-Harlan Co.	1992	9,250	$23,926	remedy selected	$2.3 million

**1990 census. ** 1990 median income of households within 4-mile radius of site. State median household income in 1990 was $22,534. ***Includes only actual cleanup costs. Remedial investigations and studies for a site, which are not included in this total, can range from $100,000 to millions of dollars per site. ****State does not concur with the U.S. EPA, no action finding.*
Source: KY Division of Waste Management, Landview II, U.S. EPA

Louisville Selected as Pilot for U.S. EPA Brownfield Initiative

Contaminated commercial and industrial sites in urban areas, known as brownfields, have received increased attention in recent years. A U.S. Government Accounting Office report estimates there are 130,000 to 450,000 brownfields across the country. The cleanup of these sites is estimated to cost $650 billion.[11]

Financial lenders and purchasers are reluctant to invest in brownfields due to liability concerns and instead have turned to developing more pristine "greenfields" in the suburbs and rural areas. The impacts of brownfields are great, posing health

risks, reduced property values, and loss of tax revenues. Many of these sites are disproportionately located in communities of color and in poor neighborhoods.

The 1996 Kentucky General Assembly passed Senate Bill 219 which added several new provisions to address brownfields. The law sets up a mechanism to relieve a public entity from further responsibility for environmental assessment and cleanup of the site upon issuance of a letter from the state relieving the entity from further responsibility. The intent is to provide private interests incentive to acquire and develop brownfields by releasing them from any future site liability.

The U.S. EPA has also proposed a new effort to clean up and redevelop brownfields. The U.S. EPA Brownfield Initiative, launched in Jan. 1996, is an effort to attract investment by streamlining regulations. Brownfields legislation has also been introduced in Congress to address liability issues and provide financial support to states to help clean up these sites.

The City of Louisville was selected in 1995 as one of U.S. EPA's 50 Brownfield projects to assess, safely clean up, and sustainably reuse brownfields. Brownfields in Louisville cost the city about $8.7 million annually in lost property tax revenues and have significantly affected the revitalization of inner-city neighborhoods.[12] Louisville chose the Ni-Chro Plating site as its brownfield pilot project. The site was a former metal plating plant located in the city's heavy industrialized corridor. The corridor encompasses 5,401 acres including the city's most distressed neighborhoods. The brownfields program in Louisville has statewide implications, as these sites are know to exist even in the smallest of towns throughout Kentucky.

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Underground Storage Tanks

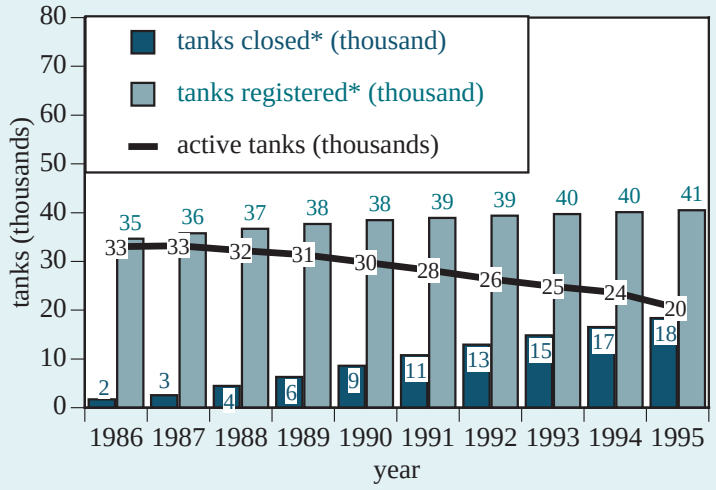
Underground petroleum and hazardous chemical storage tanks began to be regulated in Kentucky in 1986. These tanks can pose pollution threats to drinking water supplies and the environment. State and federal laws now require underground tanks that store petroleum or hazardous chemicals to be registered and be closed, removed, or upgraded to meet various protective measures by 1998.

Underground storage tanks (USTs) were required to meet release detection requirements by Dec. 22, 1993. As of 1995, 55% of the active tanks in Kentucky met release detection rules.

Half of the 20,368 Active Tanks Will Require Closure, Removal, or Upgrading to Meet 1998 Federal Requirements

Underground storage tanks (USTs) were required to meet release detection requirements by Dec. 22, 1993. As of 1995, 55% of the active tanks in Kentucky met release detection rules. By 1998, tanks must meet spill, overfill, and corrosion protection requirements. As of 1995, 30% of the active tanks in Kentucky met spill prevention, 28% met overfill, and 50% met corrosion protection requirements. It is estimated that half of the 20,368 active tanks will require closure, removal, or upgrading to meet the 1998 federal requirements **(Figure 37 & 38)**.

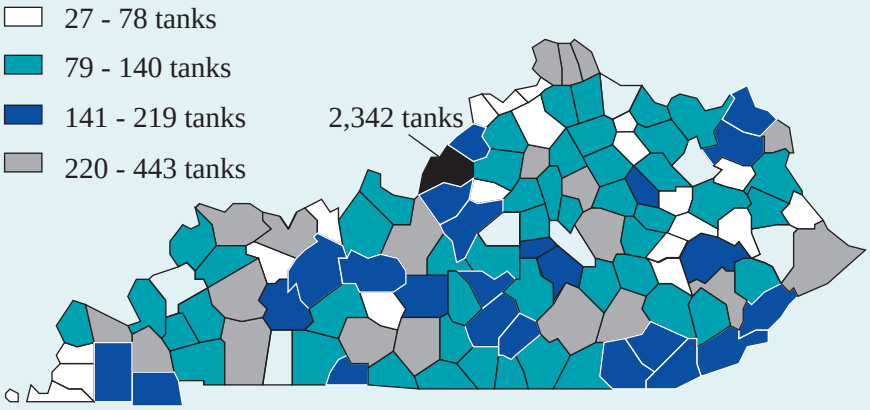
Figure 37 Underground Storage Tanks in KY



**Cumulative yearly total. Source: KY Division of Waste Management*

By 1998, tanks must meet spill, overfill, and corrosion protection requirements. It is estimated that half of the 20,368 active tanks will require closure, removal, or upgrading to meet the 1998 federal requirements.

Figure 38 Registered Active Underground Storage Tanks (1996)



Note: Includes registered petroleum and hazardous chemical underground storage tanks regulated by the state. Source: KY Division of Waste Management

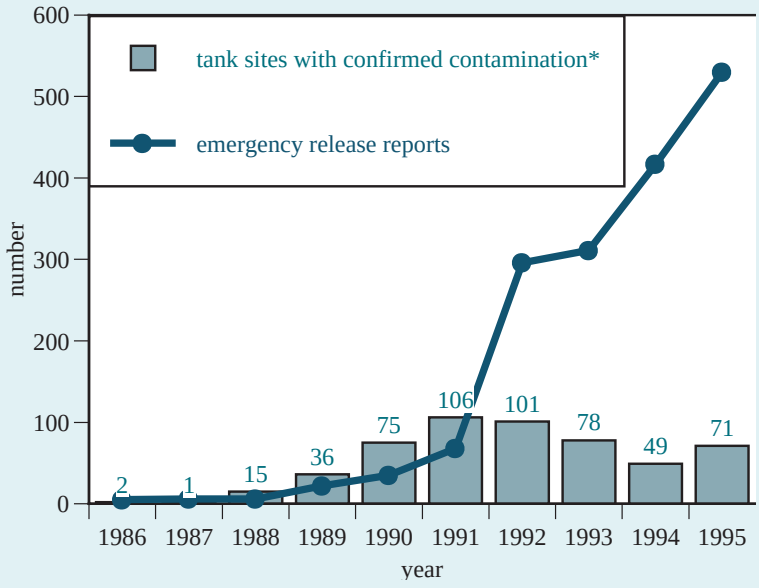
Investigations at 6,000 UST facilities in Kentucky detected soil or water contamination at 9%, or 534 tank sites which required long-term cleanup **(Figure 39)**. There has also been a 93% increase in emergency releases reported by USTs between 1990 and 1995, from 35 to 530. This increase is attributed to programmatic changes that have allowed for better tracking of releases, new regulations requiring release detection, and the aging of many tanks.

UST Inspections Increase, More Violations Discovered

Efforts to bring USTs into compliance with federal and state rules are ongoing. In 1995, there were four times as many inspections of tanks as were conducted in 1994 **(Figure 40)**. Consequently, more violations were cited and penalties assessed than in previous years. The increase was largely due to an effort to make the state UST program more efficient and clear out the backlog of cases. Many violations were administrative in nature. During 1995, 53 UST facilities were assessed fines

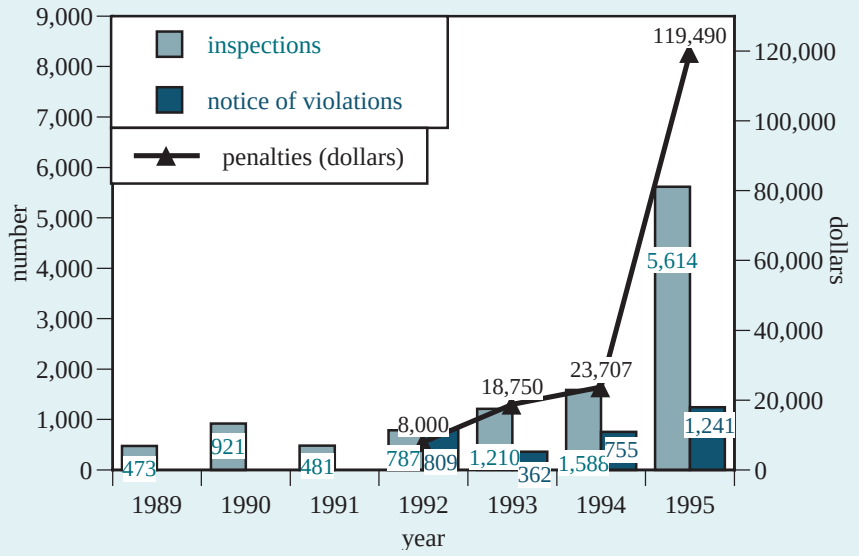
Investigations at 6,000 UST facilities in Kentucky detected soil or water contamination at 9%, or 534 tank sites which required long-term cleanup. There has also been a 93% increase in emergency releases reported by USTs between 1990 and 1995, from 35 to 530.

Figure 39 Underground Storage Tank Contamination in KY



**Groundwater and/or soil. Source: KY Division of Waste Management*

Figure 40 Underground Storage Tank Enforcement and Compliance Trends in Kentucky



Source: KY Division of Waste Management

In 1995, there were four times as many inspections of tanks as were conducted in 1994 . Consequently, more violations were cited and penalties assessed than in previous years. During 1995, 53 UST facilities were assessed fines ranging from $100 to $5,000.

ranging from $100 to $5,000.

The state program to register tanks and review corrective action plans led to a significant backlog of cases due to a lack of resources and personnel. In Dec. 1995, a two-year backlog of more than 3,000 applications was awaiting review. The Cabinet for Natural Resources and Environmental Protection initiated a project to tackle the backlog of cases. Between Jan. 1996 and March 1996, the Cabinet assembled a workgroup of 42 employees to process the 3,266 UST cases using risk-based standards. The state risk-based UST standards went into effect April 18, 1994. These standards consider type of soils, depth to groundwater, environmentally sensitive features, drinking water impacts, and fumes in structures to determine cleanup levels. The Cabinet does have the option of reopening a UST case to take further action if contamination problems are suspected. To date, 10 UST cases have been reopened.

The state risk-based UST standards went into effect April 18, 1994. These standards consider type of soils, depth to groundwater, environmentally sensitive features, drinking water impacts, and fumes in structures to determine cleanup levels.

Fund Finances 896 UST Projects at $106.1 Million

The Petroleum Storage Tank Assurance Fund was established in 1990. The purpose of the fund is to provide insurance to tank owners and help pay for tank site cleanups. The state law was later amended in 1994 to help raise additional money to pay for tank site cleanups. The law now provides for a fee of 1.4 cents per gallon of motor fuel sold in the state to finance the fund. The Fund is administered by the Office of Petroleum Tank Environmental Assurance Fund.

As of Oct. 1996, $106.1 million has been obligated from the fund to 896 applicants and approximately $25.2 million remained unobligated. The fund has about $24.2 million in potential obligations awaiting processing. To date, 296 of the funded projects have been completely remediated at an average cost of $47,809 per site. There are 600 UST site cleanups underway with a projected average cost of $147,809 per site. Cleanup costs at tank sites are expected to decline due to the use of state's new risk-based UST cleanup standards. It has taken, on average, one year to obligate monies to reimburse tank owners for corrective action costs. It is anticipated that a recent restructuring of the agency responsible for administering the funds will speed the time it takes to process a claim.

There are 600 UST site cleanups underway with a projected average cost of $147,809 per site. Cleanup costs at tank sites are expected to decline due to the use of new state risk-based UST standards.

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